

COLLABORATION AMONG HERBARIA AND BOTANICAL GARDENS

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ABSTRACT

As obvious as the desirability of collaboration among botanical gardens and herbaria may be, such collaboration is observed generally not to reach optimal levels. The scientific and research goals of herbaria as opposed to the public or broad-service orientation of gardens should not preclude active collaboration. Each needs the other for mutual advocacy. The data management challenges of the two are closely related, and we have reached a point where in effect all well curated natural history collections can be linked electronically into one large pool for sampling and data-retrieval purposes. This comes at a time when the value of living collections is on the rise for chemical and pharmacological research. Education is basic to all botanical activity, and joint programming is richer and is more efficient than the opposite, especially at a time when natural history education is interpretable as increasing in value to human society. If the need for humanity to relate more closely and respectfully to nature drives botany into increasing prominence, the impetus should not impact herbaria and botanical gardens independently, but rather as integrated representatives of botany, plant diversity, biodiversity, and nature.

The general desirability of collaboration among botanical gardens and herbaria is obvious. After all, herbaria and botanical gardens are among the few institutions dedicated to plant diversity. We have similar data management challenges: keeping track of the taxonomy, nomenclature, literature, origins, and whereabouts of vast numbers of plant specimens. Botanical gardens and herbaria are both prone to teaching about plants. We have common problems, including the joint need to promote botany in a highly competitive scientific world. We both are in positions to understand the diminishment of plant diversity, contemplate the consequences, and participate in plant-related conservation initiatives.

Why then is there not more collaboration among gardens and herbaria, even between obvious pairs? Perhaps the chief impediment is a fundamental difference in basic goals.

Even though botanical gardens and herbaria both deal with plant diversity, they differ in outlook and goals. Modern herbaria are scientific research institutions, with a primarily scientific audience, and tend toward increasing integration with other sciences. Their goals are comparatively clear. By contrast, many botanical gardens (or the cultivated components of herbarium/garden combos) have

undergone evolution and often diversification of purpose. Many started out as private horticultural estates, or as plant collections accumulated for relatively narrow purposes depending on a narrow, often private, funding base. Most botanical gardens now are publicly owned or subsidized, and must serve accordingly. Under the broad category of public service or service to the larger organizations to which they belong (such as city, county, or state governments, or universities), botanical gardens have diffuse goals, often mixed within the individual garden. The goals often have to do with ornamental horticulture or public interpretation. University gardens have the duties of facilitating teaching and research. Herbaria are project-oriented, and botanical gardens are service-oriented.

Pursuing our differing goals along different tracks is no reason to fail to strive to collaborate. On the positive side, our differences serve to minimize competition while leaving the door open to selective collaboration.

At the grossest level, a goal common to herbaria and gardens is financial well-being. If botany is seen as one small voice in a very big, highly competitive world of funding for science and education, the botanical voice should be harmonized. We need each other to promote the overall well-being of botany.

But more specifically, how can we help boost each other's goals? What can a garden offer an herbarium? Perhaps now more than ever living collections can be extensions of preserved collections and of each other, and thus broaden the pool of research resources. At the same time, research activities that make use of living plants appear to be on the rise: molecular work and plant-based pharmacology, are prominent examples. At present the University of California Botanical Garden receives about 70 requests per year for fresh research materials. As the data base improves, as our ability to share data improves, and as visibility of the collection improves, we expect demand to rise substantially. Overnight delivery services help compliance with requests. In a low-tech sense, herbarium researchers with convenient electronic and overnight-delivery access to living collections can always benefit by access to fresh, living plants as subjects for illustrations and photographs; as subjects for dissections, chromosomal, anatomical, or morphological work; as opportunities to settle questions or observe biological phenomena not answered by pressed specimens; as subjects for obtaining enhanced familiarity with taxa of interest; as a botanically inspiring setting for functions and visits; and for teaching.

An additional way that botanical gardens support herbaria is by serving as a public face for botany. Visits to botanical gardens are the only exposure to botany experienced by immense numbers of people. Most botanical gardens have public outreach programs, and most of the programs reach thousands of schoolchildren. At the UC

Botanical Garden, the figure is about 4,000 per year on school tours, apart from those coming for day camp, non-school activities, special programs, and with families. Drop-in visitorship is considerable. According to the International Directory of Botanical Gardens, the larger gardens in the U.S. each bring in well over 500,000 visitors per year. Most cities have one or more botanical gardens, and in the Bay Area, there are at least eight public gardens presenting botany and related subjects to hundreds of thousands of visitors. Beyond visitors, botanical gardens often issue public publications, and draw media attention. Media attention to the Missouri Botanical Garden alone has undoubtedly lifted the status of U.S. botany.

How then do herbaria contribute to the goals of a botanical garden? The need is embodied in the term "botanical garden." Botanical gardens often tend to drift from rigorous scientific botany. Few have the benefit of any or many plant taxonomists devoted to curation and programming. Gardens benefit enormously from access to practicing botanical scientists. Maintaining a living plant collection requires constant attention to plant identifications, taxonomic updates, and nomenclatural correction. At the University of California Botanical Garden, help from the UC herbaria has helped maintain curatorial quality, with ferns being the most recent example. And beyond curation, interpretation and education are far richer when herbarium-enriched.

Both types of institutions tend to be active educationally, and this happy business is a perfect opportunity to watch for collaborative possibilities. Gardens offer the perfect sites for botanical education, access to living plants, existing audiences, publicity devices, and expertise, including horticultural know-how, and experience with public programming. Herbaria can always provide a scientific perspective, and often well-traveled teachers with tremendous knowledge. Several herbarium researchers come to mind who are known to public audiences. Drawing upon both gardens and herbaria, it is possible to combine information on taxonomy with fresh, colorful living specimens, and it is possible to bring the broadest possible expertise to bear on subjects of common interest, such as local environmental issues, or popular plant assemblages such as orchids or California natives. A joint herbarium-garden program on a given plant group can span the spectrum from fine points of nomenclature, to ecology, to horticulture. Public consumers of plant-related programming don't see and don't much care about a distinction between botanical garden and herbarium. They are more interested in overall quality, in learning about plants, and in exposure to the people who know the most. Pooling educational resources works, because it costs little, and the payoff is undisputable.

To summarize, the time is right for herbaria and botanical gardens to find renewed interest in collaboration. Botany is not a high-budget,

high-profile science; we need a unified voice to be heard. And perhaps botany's star is on the rise as knowledge of plants becomes increasingly critical to grappling with problems of the 21st century: feeding and medicating 10 billion people, finding alternative fuels, and creating a green, healthy, and pleasing climate for humans and the rest of nature. The increasingly visible and increasingly promising human-oriented aspect of botany gives botanical gardens and herbaria new, intertwined opportunities. The potential roles of herbaria and gardens in all of that are tightly linked, since the grandest goals of botany must involve the broadest research resources possible.

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